

RECLAMATION

Managing Water in the West

Draft Environmental Assessment

Tranquillity Irrigation District/San Luis Water District Groundwater Exchange Program – 2009 through 2011

EA-09-99



U.S. Department of the Interior
Bureau of Reclamation
Mid Pacific Region
South Central California Area Office
Fresno, California

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Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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List of Acronyms, Abbreviations and Definition of Terms

af	acre-feet (the volume of water one foot deep and an acre in area)
af/y	acre-feet per year
APE	area of potential effect
Aqueduct	California Aqueduct
bgs	below ground surface
CVP	Central Valley Project
CVPIA	Central Valley Improvement Act
DMC	Delta-Mendota Canal
DSA	Direct Service Area
DWR	California Department of Water Resources
EA	Environmental Assessment
EC	Electrical conductivity
ESA	Endangered Species Act
FSWD	Fresno Slough Water District
FWCA	Fish & Wildlife Coordination Act
FWS	U.S. Fish and Wildlife Service
ITA	Indian Trust Assets
MBTA	Migratory Bird Treaty Act
M&I	municipal and industrial
msl	mean sea level
NHPA	National Historic Preservation Act
Reclamation	Bureau of Reclamation
SJR	San Joaquin River
SJV	San Joaquin Valley
SLR	San Luis Reservoir
SLWD	San Luis Water District
SOD	South of the Delta
SWP	California State Water Project
SWRCB	State Water Resources Control Board
TQID	Tranquillity Irrigation District

Section 1 Purpose and Need for Action

1.1 Background

The State of California is experiencing unprecedented water management challenges. Both the State and Federal water projects are forecasting very low storage conditions in all major reservoirs. Specifically for the Central Valley Project (CVP), two primary factors are governing the severe reduction in water supplies. These include: 1) low reservoir water supply conditions coming into 2009 from a dry 2008 and 2007, and 2) Delta pumping restrictions imposed by the Delta Smelt Biologic Opinion (B.O.). The Bureau of Reclamation (Reclamation) has declared an unprecedented reduction in allocated water available to South of Delta (SOD) contractors for the 2009 water year.

In response to California's third consecutive year of drought, Governor Schwarzenegger proclaimed a state of emergency on February 27, 2009. In the proclamation, the Governor found that the drought conditions and water delivery limitations identified in last year's Executive Order and Emergency Proclamation still exist, and have worsened in this third year of drought, creating emergency conditions throughout the State of California.

Due to pumping constraints and drought, CVP agricultural contractors SOD have been allocated only 10 percent of their contracted water supply, the lowest allocation in the history of the CVP. The San Luis Water District (SLWD) is in desperate need of additional water supplies.

1.2 Purpose and Need

California is experiencing another dry year in 2009. SLWD has over 24,000 acres of permanent crops and needs additional water to supplement their 10 percent water supply allocation. Reclamation is interested in facilitating solutions to water management challenges. Reclamation recognizes the need to use a measure of flexibility in facilitating/approving needed transfers and exchanges.

This proposed exchange would assist in offsetting the effects of drought and regulatory impediments to the delivery of CVP supplies to SLWD. The proposed exchange water is needed by SLWD for in-district irrigation demands of permanent crops in 2009 and 2010 water years.

1.3 Scope

This environmental assessment (EA) has been prepared to examine the impacts of the Proposed Action on the CVP service area boundary of Tranquillity Irrigation District (TQID), areas potentially impacted by groundwater pumping and subsidence that may be associated with the TQID Well Field, and the SLWD service area boundary as the area where the CVP water made available by the exchange would be applied. Additionally, water quality of pumped groundwater introduced into Fresno Slough and Mendota Pool would be a potential area of impact that will be addressed. See Figure 2-1 for a location map showing subject district boundaries and significant nearby CVP facilities.

1.4 Potential Issues

Potentially affected resources in the Proposed Action vicinity include:

- Air Quality
- Surface Water Quality
- Groundwater Levels
- Land Subsidence
- Land use
- Biological Resources
- Cultural Resources
- Indian Trust Assets
- Socioeconomic Resources
- Environmental Justice

1.5 Authorities for the Proposed Action

The Proposed Action analyzed in this EA is subject to the following contracting authorities and guidelines as amended and updated and/or superseded:

- Title XXXIV Central Valley Project Improvement Act (CVPIA), October 30, 1992, Section 3405 (a)
- Reclamation Reform Act, October 12, 1982
- Section 14 of the Reclamation Act of 1939
- *Contracts for Additional Storage and Delivery of Water* – CVPIA of 1992, Title 34 (of Public Law 102-575), Section 3408, Additional Authorities (c) authorizes the Secretary of the Interior to enter into contracts pursuant to Reclamation law and this title with any Federal agency California water user or water agency, State agency, or private nonprofit organization for the exchange, impoundment, storage, carriage, and delivery of CVP and non-CVP water for domestic,

municipal, industrial, fish and wildlife, and any other beneficial purpose, except that nothing in this subsection shall be deemed to supersede the provisions of section 103 of Public Law 99-546 (100 Stat. 3051). The CVPIA is incorporated by reference.

- Reclamation's Interim Guidelines for Implementation of Water Transfers under Title XXXIV of Public Law 102-575 (Water Transfer), February 25, 1993
- Reclamation and United States Fish and Wildlife Service (FWS) Regional, Final Administrative Proposal on Water Transfers, April 16, 1998
- Reclamation's Mid-Pacific Regional Director's Letter entitled "Delegation of Regional Functional Responsibilities to the CVP Area Offices – Water Transfers", March 17, 2008

1.6 Related Environmental Documents

Groundwater Pumping/Water Transfer Project for 25 Consecutive Years Environmental Assessment/Initial Study SCH# 2007072012; November 30, 2007. Under this Proposed Action, the primary method for developing the water is localized groundwater pumping and the primary purpose was to alleviate drainage impacts in Central California Irrigation District (CCID) and Firebaugh Canal Water District (FCWD). Furthermore, an additional purpose for the Proposed Action is to develop a water supply for transfer that would provide funding for managing shallow groundwater levels within a portion of the San Joaquin River Exchange Contractors' [Exchange Contractors] (CCID, FCWD, Columbia Canal Company, and San Luis Canal Company) service area and implementation of capital improvements. Only drainage-impaired areas of approximately 28,000 acres within the two districts would be involved in water development. The application of the pumped groundwater to FCWD agricultural lands frees up commensurate surface water supplies for use by other CVP contractors as a transfer. None of the transfer water is proposed for other Federal uses such as the SJV wildlife refuges or the Environmental Water Account considered in the 2005-2014 transfer program. The transfer water for this program would be used by San Luis Unit (West San Joaquin Division) contractors and Santa Clara Valley Water District (San Felipe Division). FCWD's participation is up to 10,000 af, on an annual basis. (Reclamation 2007)

- *Environmental Impact Statement and Record of Decision Mendota Pool 10-Year Exchange Agreements*, #01-81, (Reclamation 2004) – This environmental impact statement analyzed the environmental effects of a 10-year exchange project of groundwater and surface water resources between Reclamation and Mendota Pool. A water quality monitoring program was incorporated into the proposed project to assess environmental impacts.

- *Approval of One-Year Temporary Warren Act Contracts for the Conveyance of Non-CVP Water in the Delta Mendota Canal, EA/Finding of No Significant Impact (FONSI)-08-98* - This EA evaluated the impacts on environmental resources as a result of conveying non-CVP water in federal facilities and groundwater pumped from wells directly into the DMC not to exceed a total combined amount of up to 50,000 AF. This EA is incorporated by reference.
- *EA/FONSI-01-24 Mendota Pool Exchange Agreement* – The 2001 pumping program added mitigation objectives were developed as part of the “Agreement for Mendota Pool Transfer Pumping Project” in order to minimize the potential impacts of the pumping program. The mitigation objectives were developed as a result of the 1999 and 2000 Transfer Pumping Programs.

Section 2 Alternatives Including the Proposed Action

2.1 No Action

Under the No Action Alternative, Reclamation would not approve the proposed exchange of up to 14,000 acre-feet over a two year period of TQID pumped groundwater for CVP water otherwise delivered to Mendota Pool. SLWD would not obtain the additional water supplies for either contract years 2009 or 2010 from San Luis Reservoir via existing points of diversion from the San Luis Canal, placing permanent crops at risk

2.2 Proposed Action

Reclamation proposes to approve an exchange of groundwater pumped from the TQID Well Field of up to 6,000 acre-feet for the balance of this water year (2009-2010) and up to 8,000 acre-feet next water year (2010-2011). This groundwater would be pumped into the TQID distribution systems connected to either the Fresno Slough Main Canal or the Tranquillity Main Canal and then diverted to spill into the neighboring Fresno Slough which flows into the backwaters of Mendota Pool. There the water would be exchanged with Reclamation for water that would otherwise be delivered to CVP contractors (Exchange Contractors and/or other CVP contractors). There would be losses of 5 percent accounted for in Mendota Pool in exchanging this water. Otherwise, the exchange would be “bucket-for-bucket.”

TQID routinely pumps water from the irrigation district-owned wells into their internal distribution system and then into the Mendota Pool. They use the Mendota Pool as a temporary storage facility until the demands within the district catch up to the pumping. Every year SLWD purchases water from numerous sources to protect supply permanent crops. TQID sells water temporarily to surplus their immediate needs. TQID would sell this pumped in water to SLWD via the exchange with Reclamation. The proceeds for the sale would offset TQID capital and operational costs.

By the end of the year, SLWD and/or their growers would likely have purchased water from approximately 12 different sources. TQID is just one of those sources.

Reclamation would facilitate the exchange of TQID groundwater for CVP supplies resulting in either 1) CVP water delivery to SLWD via the San Luis Canal at existing points of diversion within 30 days of the TQID groundwater delivery to the Mendota Pool or (2) water being made available to SLWD in the San Luis Reservoir for later

delivery via the San Luis Canal to existing points of diversion. All deliveries to or storage of exchange water to SLWD would occur on a schedule approved by Reclamation. The San Luis Delta-Mendota Water Authority would account for the pumped-in water, water delivered and any water stored.

Pursuant to TQID historic practice regarding water quality associated with pumping groundwater for exchange in Mendota Pool, the quality of such pumped groundwater would be analyzed at the location where waters would be introduced into the Fresno Slough. Each year, prior to commencement of this exchange program, water quality at these points would be analyzed for all constituents included in the “Ag Suitability” water quality suite. Electrical conductivity (EC) would be monitored continuously during the exchange program deliveries via TQID EC probes and telemetry. EC data would be available in real time at the TQID offices. Water quality would at all times comply with water quality standards established for pumped groundwater entering Mendota Pool as described under *Groundwater Level Measurements* in the Affected Environment section. Testing would occur prior to the beginning of pumping for purposes of providing water for this exchange for each irrigation season.

Additionally, TQID would monitor groundwater levels in existing wells near the TQID Well Field on a monthly basis. The intent of this monitoring is to prevent groundwater levels from reaching what are believed to be historic low levels so as to insure that there would not be any inelastic subsidence in the area resulting from the extended use of the TQID Well Field by TQID. See Figure 2-2 for the location of the TQID Well Field and the wells to be monitored. Please note that the TQID Well Field is located both within TQID service area and in the northern portion of Fresno Slough Water District (FSWD).

The groundwater pump-in would not exceed the cumulative annual 50,000 acre-feet aggregate pump-ins analyzed under EA-08-98.

Reclamation would require that water pumped and delivered under the proposed exchange meet minimum water quality standards for TDS, pH, and selenium (see below). To achieve this end, the following water quality requirements would be imposed:

- Groundwater from the TQID wells would not be introduced into Fresno Slough (backwaters of the Mendota Pool) when the EC measured by the continuous EC recorders at the intake of the Firebaugh Intake Canal; the intake of the Main Canal; or the intake of the Columbia Canal exceeds the EC of the inflow to the Mendota Pool from the DMC by more than 90 for three days.

- If EC limitations are exceeded pumping by TQID wells, groundwater delivery to the Fresno Slough would not resume until the EC at the affected canal intake is no more than 30 above the EC of the inflows to the Mendota Pool from the DMC for three days.
- TQID would test weekly for the following constituents at the locations where water would be diverted and spilled into the Fresno Slough. The groundwater pump-in quality at those locations would not exceed the limits specified below:
 - Total dissolved solids – 1,200 ppm
 - PH – between 6.0 and 9.0
 - Selenium – 2.0 µg/L

No native or untilled land (fallow for 3 years or more) may be cultivated with CVP water involved in these actions.

No new construction or modification of existing facilities is to occur in order to complete the proposed exchange.

This exchange involving CVP water would not alter the flow regime of natural waterways or natural watercourses such as rivers, streams, creeks, ponds, pools, wetlands, etc., so as to have a detrimental effect on fish or wildlife or their habitats.

This exchange involving CVP water would comply with all applicable federal, state and local laws, regulations, permits, guidelines and policies.

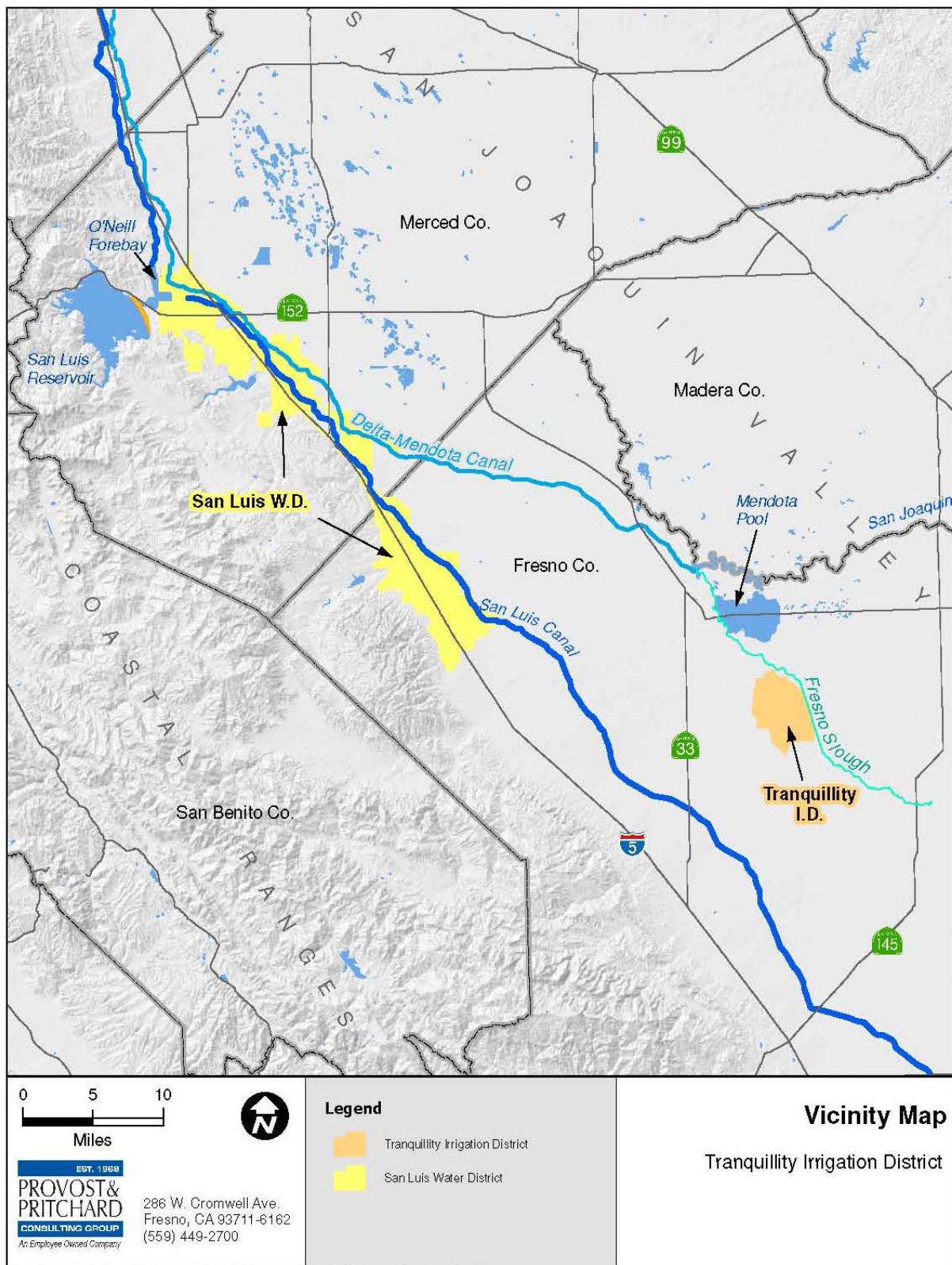


Figure 2-1 Location Map - TQID, SLWD, Mendota Pool, SLR and SLC

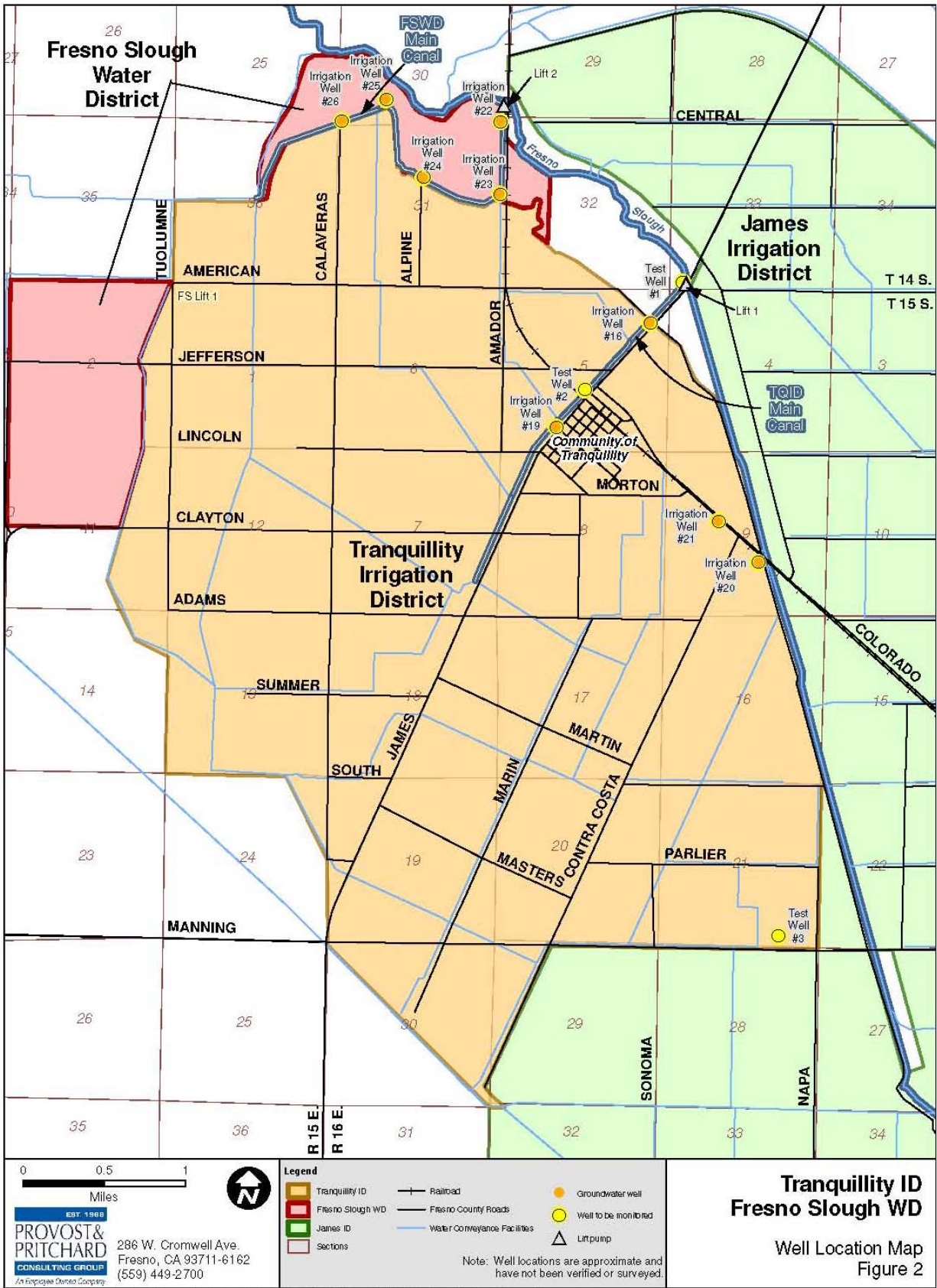


Figure 2-2 Location Map – TQID Well Field, Lifts and Monitoring Wells

Section 3 Affected Environment and Environmental Consequences

3.1 Water Resources

3.1.1 Affected Environment

SLWD and 2009 Contract Allocations

SLWD is located on the western side of the SJV near the town of Los Banos and within both Merced and Fresno Counties. SLWD was formed in 1951 and is comprised of 66,218 acres, of which approximately 56,500 is irrigable. Due to declining water supply reliability, in recent years irrigated acreage has averaged around 34,000 acres. SLWD entered into a long-term contract with Reclamation in 1959 for 93,300 af/y of CVP water. This contract was superseded with a contract executed in 1974, for a maximum of 125,080 af/y of CVP water. In December 2008, Reclamation and SLWD executed an Interim Renewal Contract (No. 14-06-200-7773A-IR1 for the same 125,080 acre-feet). Although water deliveries by SLWD historically have been almost exclusively used for agricultural use, substantial development in and around the cities of Los Banos and Santa Nella have resulted in a shift of some water supplies to M&I use.

The 10-year average allocation of CVP water supplies delivered to the SOD agricultural water contractors is described in Table 3-1. It lists maximum deliveries of CVP water on a yearly basis from 1999 to 2009. The 10-year average is 61 percent of contract maximum amounts. With an annual contract maximum for SLWD of 125,080 acre-feet, the average CVP supply to SLWD has been 76,299 acre-feet. With a 2009 allocation of only 10 percent (12,508 acre-feet) SLWD is 63,791 acre-feet below the typical supply levels. Thus, SLWD needs additional water resources to meet their minimum in-district demands.

Table 3-1 SOD Agricultural Allocation
(as Percentage of Contract Maximum Amounts)

Year	Allocation (%)
08 – 09	10
08 – 09	40
07 – 08	50
06 – 07	100
05 – 06	85

04 – 05	70
03 – 04	75
02 – 03	70
01 – 02	49
00 – 01	65
Average	61%

Tranquillity Irrigation District and 2009 Contract Allocations

TQID was formed on January 22, 1918, as a public agency designed to serve the local community with water. It is the second oldest such agency in Fresno County. A Board of Directors elected from the District at-large governs the District. The District is responsible for acquisition and delivery of surface water and groundwater for irrigation purposes. Additionally, the District, when formed, established the Community of Tranquillity, an unincorporated community which is wholly within the District boundary. When initially established, the District was responsible for domestic water supply, energy production, recreation, streets and roads, and lighting. TQID encompasses approximately 10,750 acres in the west central portion of Fresno County in California's Central SJV.

Also as a SOD CVP agricultural water contractor, TQID has experienced similar reductions as SLWD to their CVP contract supply. Fortunately, TQID also has access to CVP water supplies based upon historic water rights that were affected by the construction of Friant Dam on the San Joaquin River. This water rights settlement water has priority delivery status and as such is a firmer source of supply only suffering from limited reductions in drought years. The 10-year average allocation of CVP water supplies delivered to TQID is described in Table 3-2. It lists maximum deliveries of CVP water on a yearly basis from 2000 to 2010. The 10-year average is 61 percent for TQID's SOD agricultural water supply contract maximum entitlement and 100 percent of its settlement contract entitlement. The annual contract entitlement for TQID is 13,800 acre-feet SOD agriculture and 20,200 acre-feet of settlement entitlement, thus the 10-year average supply is 8,418 acre-feet of SOD agriculture and 20,200 acre-feet of settlement supplies (total equals 28,618 acre-feet). TQID's 2009 CVP water supply is currently estimated to be 1,380 acre-feet of SOD agriculture and 20,200 acre-feet of settlement supplies for a total of 21,580 acre-feet. TQID also has access to groundwater (TQID Well Field) and maintains high flow rights to the Kings River.

TQID has determined it has enough water to weather the shortfalls in CVP allocations for 2009. TQID anticipates pumping 9,200 acre-feet in 2009 from its Well Field to assist in meeting in-district needs in addition to the 6,000 acre-feet it is willing to pump to benefit

SLWD consistent with this exchange. TQID anticipates pumping volumes to be similar in 2010 unless water allocations in the CVP markedly improves over 2009.

Table 3-2 TQID CVP Allocation
(as Percentage of Contract Amounts)

Contract Year	Allocation (%)	
	SOD Ag	Settlement
09 – 10	10	100
08 – 09	40	100
07 – 08	50	100
06 – 07	100	100
05 – 06	85	100
04 – 05	70	100
03 – 04	75	100
02 – 03	70	100
01 – 02	49	100
00 – 01	65	100
Average	61%	100%

Regional Groundwater Resources and Conditions

According to DWR Bulletin 118 (DWR 2003), groundwater provides approximately 30 percent of the total supply for the SJR Hydrologic Region. However, the amount of groundwater use within the region varies widely, both between different areas and from one year to the next.

Two primary hydrologic divisions of the SJV are agreed upon by DWR, the State Water Resources Control Board, and the U.S. Geological Survey. The San Joaquin Hydrologic Study Area comprises the northern one-third of the SJV, encompasses 3,800 square miles, and includes San Joaquin, Stanislaus, Merced, and Madera counties. The Tulare Lake Hydrologic Study Area comprises the southern two-thirds of the SJV and encompasses 7,900 square miles. The Tulare Lake Hydrologic Study Area includes Fresno, Kings, Tulare, and Kern counties (DWR 2003). SLWD sits within the San Joaquin Hydrologic Study Area, but TQID sits on the far western edge of the boundary between these two Hydrologic Study Areas. Technically TQID is part of the San Joaquin Hydrologic Study Area, but groundwater resources in the area are shared (flow back and forth) between the San Joaquin Hydrologic Study Area and the Tulare Lake Hydrologic Study Area.

Much of the SJV aquifer system is in overdraft conditions, although the extent of overdraft varies widely from area to area. In the San Joaquin Hydrologic Study Area, overdraft conditions were estimated at approximately 209,000 afy in 1990 (DWR 2003). In 1990, approximately, 19 percent (1,307,000 afy) of the regions water needs were met by groundwater pumping (DWR 2003). The Tulare Hydrologic Study Area has experienced a greater degree of overdraft, estimated at 630,000 af, with groundwater pumping estimated at 5,190,000 af for 1990 conditions. Groundwater pumping in the SJV varies seasonally. Most groundwater is withdrawn during the spring-summer growing season, although pumping in some areas may occur throughout the entire year.

In the western SJV, unconfined groundwater generally flows from the southwest toward the northeast, although groundwater pumping and irrigation complicates and changes local flow directions with time. Aquifer response to pumping and irrigation is relatively rapid, resulting in local changes in groundwater flow direction as associated temporary cones of depression and recharge mounds form and dissipate.

Groundwater conditions of the San Luis Unit of the CVP are typified by those of the Westside Sub-basin. This sub-basin consists mainly of lands in WWD and is located between the Coast Range foothills on the west and the SJR drainage and Fresno Slough on the east. TQID sits immediately adjacent to eastern edge of this sub-basin. Primary recharge to the aquifer system is from seepage of Coast Range streams along the west side of the sub-basin and deep percolation of imported surface irrigation. Flood basin deposits along the eastern sub-basin have caused near surface soils to drain poorly, thus restricting the downward movement of percolating water. This restricts drainage of irrigation water and results in the development of drainage problem areas.

Groundwater levels in the Westside Sub-basin were generally at their lowest levels in the late 1960s, prior to importation of surface water. After the CVP began delivery to the San Luis Unit in 1967-68, water levels gradually increased to a maximum in about 1987-88, falling briefly during the 1976-77 drought. Water levels began dropping again during the 1987-92 drought. Through a series of wet years after the drought, 1998 water levels recovered nearly to 1987-88 levels. The fluctuations in water levels illustrate both the importance of CVP deliveries in sustaining groundwater levels and the continuing influence of local and CVP-wide hydrologic conditions on surface water availability and, hence, on groundwater conditions in those areas where groundwater is pumped.

Tranquillity Irrigation District Well Field Groundwater Hydrology

The following discussion of the groundwater conditions in TQID and areas potentially affected by pumping of the TQID's Well Field are largely taken from the recently

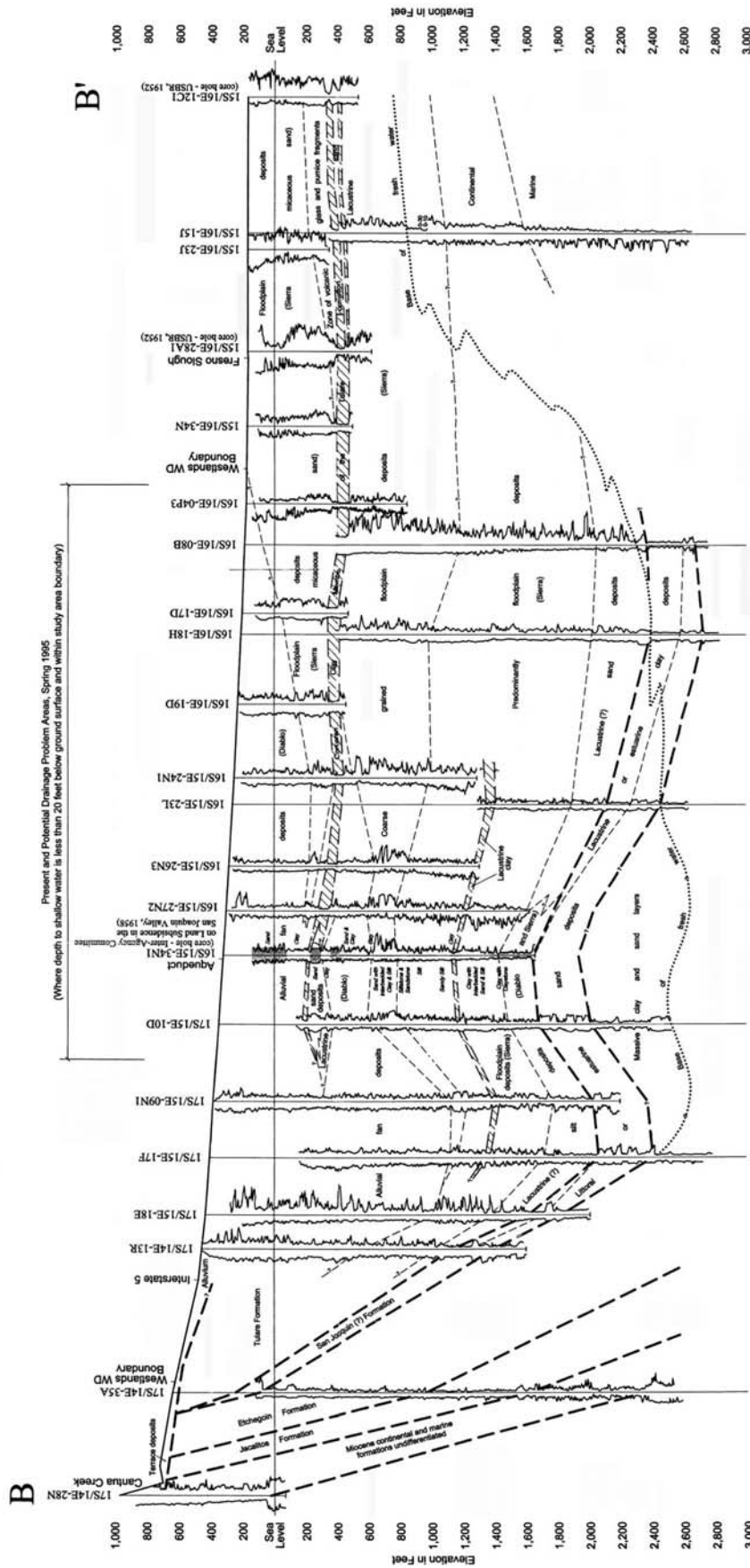
completed Groundwater Management Plan for TQID and the FSWD (Provost & Pritchard Consulting Group, May 2009).

San Joaquin Valley Overview

The SJV is part of a large, northwest-to-southeast trending asymmetric trough of the Central Valley, which has been filled with up to six vertical miles of sediment. This sediment includes both marine and continental deposits ranging in age from Jurassic to Holocene (recent). The SJV lies between the Coast Ranges on the west, the Sierra Nevada on the east, and extends northwestward from the San Emigdo and Tehachapi Mountains to the Delta near the City of Stockton. The SJV is 250 miles long and 50 to 60 miles wide. The relatively flat alluvial floor is interrupted occasionally by low hills.

The SJV is divided into several geomorphic land types including dissected uplands, low alluvial fans and plains, river floodplains and channels, and overflow lands and lake bottoms. The alluvial plains cover most of the SJV floor and comprise some of the most intensely developed agricultural lands in the SJV. In general, alluvial sediments of the western and southern parts of the SJV tend to have lower permeability than eastside deposits. The lower permeability in material along the western and southern portions of the SJV is mainly attributed to the fine-grained nature of the parent material from which the alluvium is derived. These sediments are predominately marine in origin and consist of the thick sequences of mudstone, claystone, and siltstone that make up the Coast Ranges. Upon weathering and transport down slope along alluvial fans, these sediments readily decrepitate into fine-grained materials consisting mainly of silt and clay found along the axis of the SJV trough.

Near the SJV trough, fluvial deposits of the east and west sides grade into fine-grained deposits termed Flood-basin deposits by USGS (1986). The SJV has several thick, fine-grained, lacustrine deposits. The Corcoran Clay Member of the Tulare Formation is the most notable fine-grained deposit in the SJV affecting groundwater quality and creating confined groundwater conditions below. The Corcoran Clay was deposited about 600,000 years ago in the Tulare Lake, also known as Lake Clyde. This clay bed, which is found in the western and southern portions of the SJV, separates the upper semi-confined to unconfined aquifer from the lower confined aquifer. The clay bed covers approximately 5,000 square miles and is up to 160 feet thick beneath the present bed of Tulare Lake. A cross-section showing the major clay layers in the TQID area is included as Figure 3-1.



Cross-Section B-B'. Southwest/Northeast Geologic Section near Cantua Creek
(See Plate 1 for Cross-Section Location)

Figure 3-1 Geologic Cross-Section – Figure showing the major clay layers in TQID area

Regional Hydrogeologic Setting

TQID is located in the Delta-Mendota sub-basin of the SJR Hydrologic Study Area and is the southernmost extension of the Delta-Mendota sub-basin south of the City of Mendota (Figure 3-2). TQID appears to be located in this groundwater sub-basin primarily due to the areas connection to the Fresno Slough which flows towards the Mendota Pool. However, groundwater aquifer characteristics and availability for TQID are very similar to the western edge of the Kings sub-basin and the eastern edge of the Westside sub-basin. According to DWR Bulletin 118 (2003), the SJV region is heavily reliant on groundwater with up to 30 percent of agricultural and urban supplies coming from the underground aquifers. Bulletin 118 also identifies 11 basins as being in critical conditions of overdraft. The SJV Hydrologic Study Area and the Delta-Mendota sub-basin are not included on the list of basins/sub-basins identified as being in a state of critical overdraft.

In 2001 TQID acquired lands, some of the associated water rights from those lands, and assumed water delivery responsibilities within FSWD. Since then, a series of five groundwater wells that pump from below the Corcoran clay have been developed in this area due to its proximity to the Fresno Slough. These wells, developed between 2003 - 2008, are part of a network of groundwater wells regularly used for “Transfer Pumping” through the Mendota Pool so that TQID can “stockpile” pumped groundwater through temporary storage in the Mendota Pool. The TQID Well Field pumps groundwater (maximum 6,000 af between August and November each year) into distribution systems connected to the Fresno Slough Main Canal and the Tranquillity Main Canal that would be diverted to spill into the Fresno Slough that flows into the backwaters of the Mendota Pool.

TQID developed joint groundwater management plans with FSWD, an indication of the districts’ involvement in management of their groundwater resources. As a policy, TQID does not allow private agricultural wells within TQID, rather TQID wells deliver groundwater to both the community of Tranquillity and the growers within TQID’s service area. In addition to the TQID’s CVP supply, groundwater from the TQID Well Field is available to some of the lands within TQID.

Groundwater in the TQID service area and the area potentially affected by the pumping of the TQID Well Field is divided into three separate non-marine, water bearing zones. These include the lower water-bearing zone, upper water-bearing zone and the perched or shallow zone, as described below:

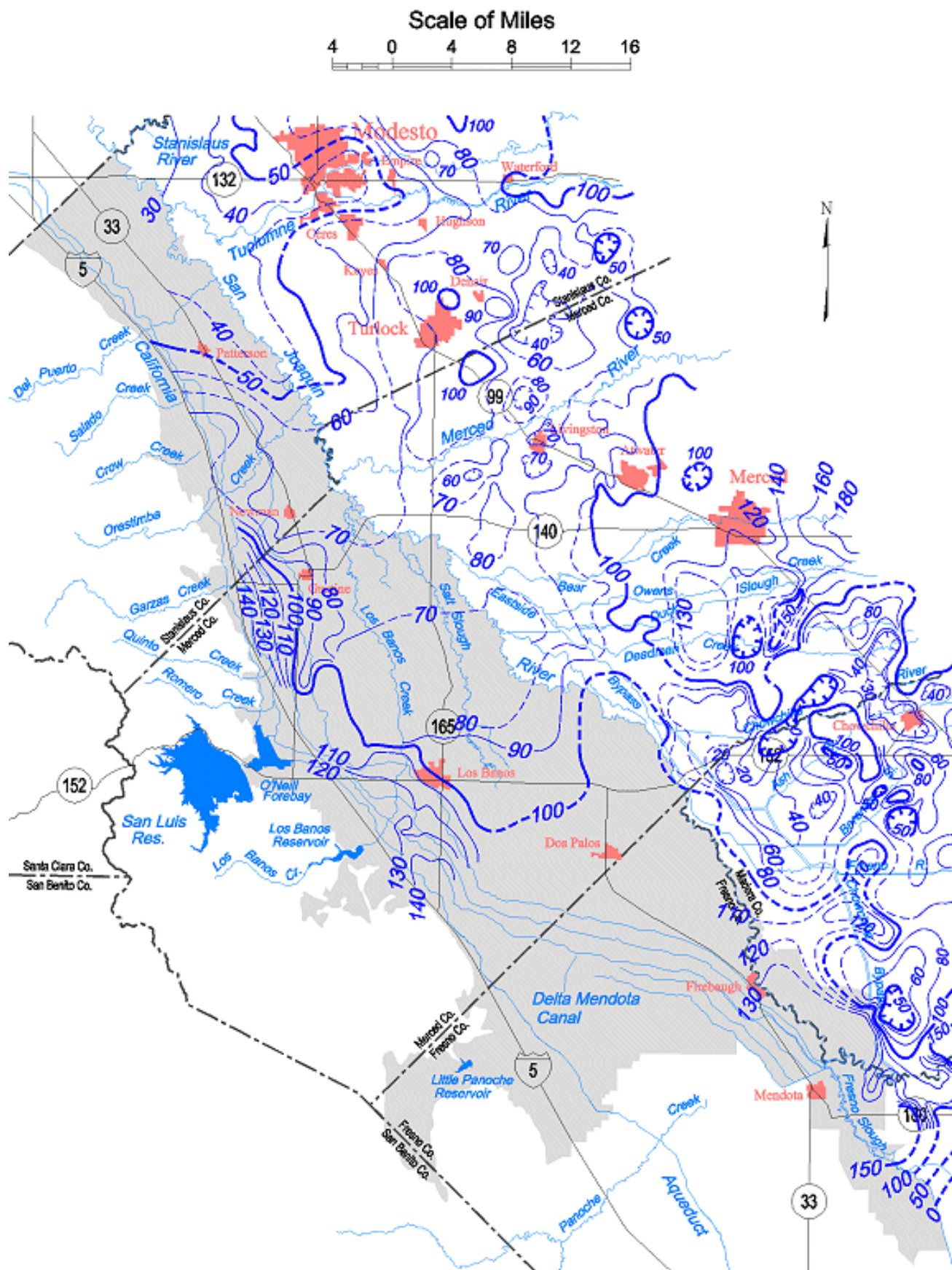


Figure 3-2 Delta Mendota Groundwater Sub-basin (Shaded Area)

- The lower water-bearing zone contains fresh water in the lower section of the Tulare Formation from the base of the E clay (Corcoran Clay) to the base of fresh water or the top of connate, saline marine water. Sokol (1955) terms the base of the fresh water aquifer as the base of the effective ground-water reservoir.
- The upper water-bearing zone is from the top of the Corcoran Clay to the upper sections of the Tulare Formation, often considered the bottom of the A clay.
- The shallow or perched zone is from the top of the A Clay, if it is present, to the perched groundwater table which is often within 10 feet or less of the ground surface. DWR Bulletin 118 uses 25 feet below ground surface (bgs) as a general vertical depth limit for the base of the perched zone.

Groundwater Level Measurements

Limited long-term water level information is available for the District. In 1998 Twining Laboratories measured groundwater levels in 21 monitoring wells with depths ranging from 10 to 168 feet (average of 48 feet). This suite of wells and the 1998 Twining data give a fairly accurate snap shot of the perched and shallow groundwater levels in the area at that time. Groundwater depths in the shallow aquifer ranged from 160 to 106 feet above mean sea level (msl), but eight wells were dry. In addition, DWR (2001) prepared a groundwater contour map showing the groundwater elevation in the plan area ranged from about 90 to 130 feet above msl (Figure 3-3).

Figure 3-4 is the DWR hydrograph of well 15S/16E-29N001M and is the most complete well hydrograph available for TQID. The hydrograph was obtained from the DWR website. The website includes a graphical interface with hydrographs for other wells in TQID and FSWD, and surrounding areas. Most of the hydrographs cover a shorter time period than the well depicted in Figure 3-4, but during periods of temporal overlap with 15S/16E-29N001M, water level trends are consistent between hydrographs.

Figure 3-4 shows groundwater levels from about 1940 to 2002 ranging from about 90 above to 30 feet below msl. The hydrograph shows a gradual steady decline in water levels until about 1965. The groundwater level then begins to rise but fluctuates substantially based on surface water supplies. For instance, during the prolonged drought in the early 1990's the groundwater level fell about 90 feet. The other hydrographs from the area show similar trends; falling water levels with the lowest water levels in the mid 1960's through the early 1970's, followed by periods of water level recovery interrupted by the droughts of 1976-77 and the early 1990's (see Appendix A for other regional hydrographs).

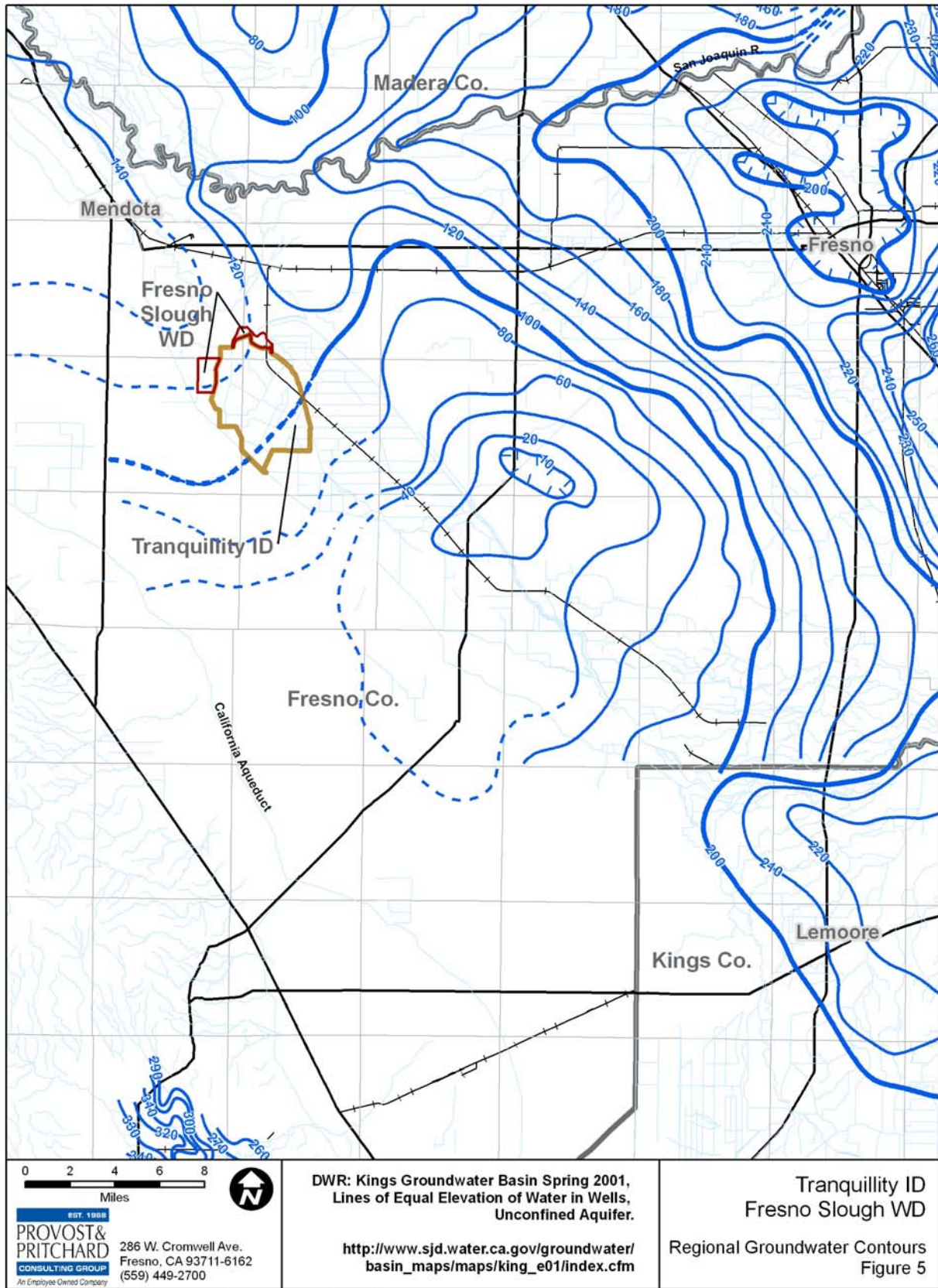


Figure 3-3 Regional Groundwater Contours –2001 DWR Water Surface Elev. (msl)

Groundwater Levels, 15516E29N001M

San Joaquin Valley (Kings Basin)

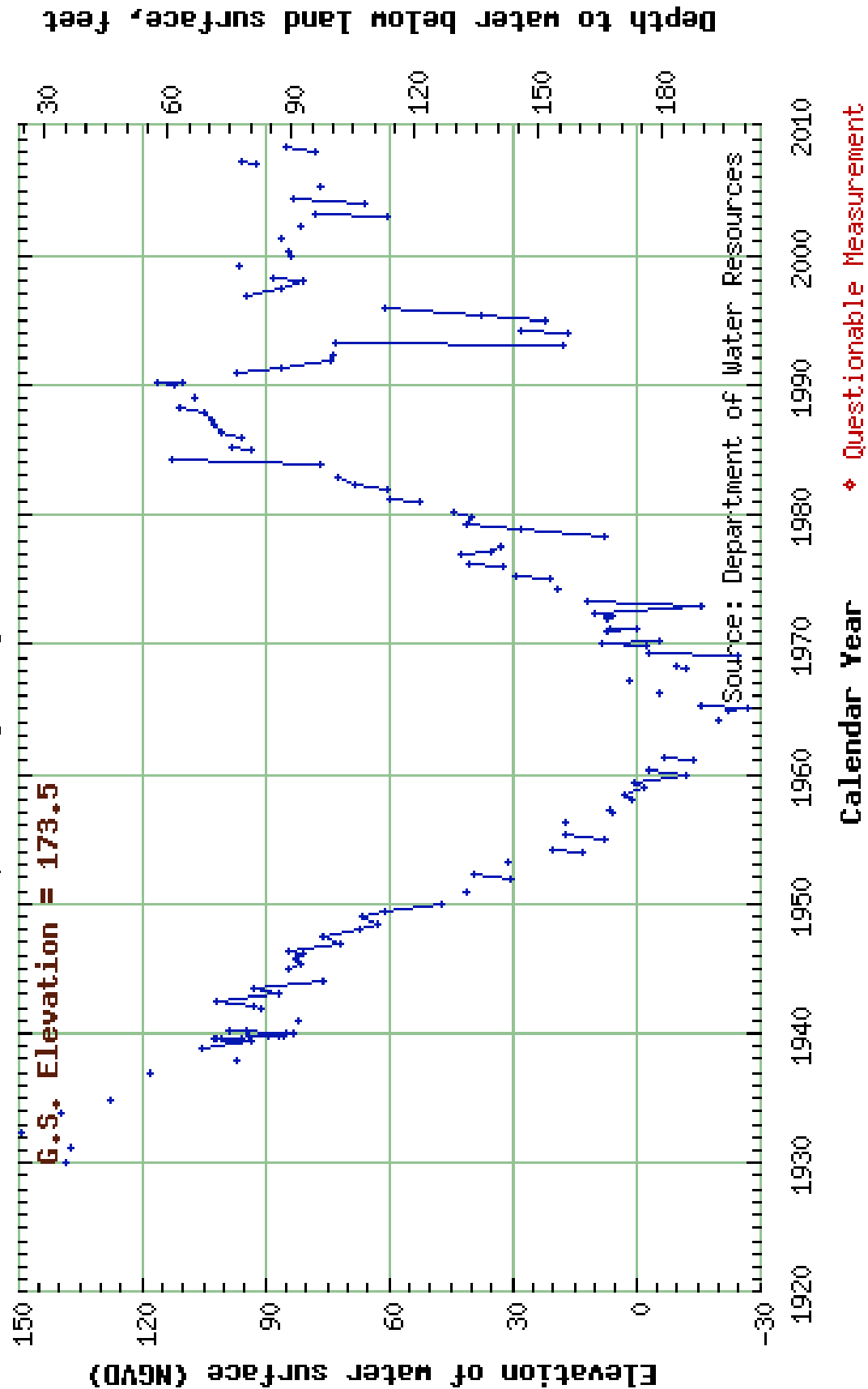


Figure 3-4 Long Term Well Hydrograph – State Well No. 15S/16E-29N001M

Well 15S/16E-221Q1M is located in the southeastern corner of TQID, while most of TQID's historic pumping has been in the northern portion of the District near the Community of Tranquillity, and current pumping is concentrated in the northern portion just outside of the TQID boundary in FSWD. In the development of their recent Groundwater Management Plan, TQID calls for future groundwater level monitoring as being important so these long-term trends can also be established in and near the pumping centers.

As part of this proposed program of groundwater pumping and exchange, TQID would monitor groundwater levels in TQID Well Field and a few nearby monitor wells. The historic low water levels in the confined aquifer in this area are believed to be at approximately 30 feet below msl. Current water levels are at approximately 40 feet above msl. The proposed program of groundwater extraction and exchange would be stopped if resulting groundwater levels appear to be within 5 feet of the historic low levels. Water levels in the groundwater extraction wells involved in the exchange (see Figure 2-2) would be monitored monthly to verify groundwater depths are within the acceptable range.

Water Quality

Water in each well currently meets water quality standards for the existing Transfer Pumping program (agreement between TQID and San Luis Delta-Mendota Water Authority [SLDMWA]) to the Mendota Pool that TQID participates in, and the monitoring of groundwater quality monitored by Central California Irrigation District and SLDMWA would continue throughout the period of the proposed exchange.

3.1.2 Environmental Consequences

No Action

The No Action Alternative consists of not approving the delivery of TQID groundwater through the Fresno Slough to the Mendota Pool in exchange for CVP water in SLR. TQID would likely pump less groundwater this year than what is being proposed, but additional groundwater pumping of poor quality would occur in the SLWD service area and/or permanent crops would be at risk.

Proposed Action

Under the Proposed Action, Reclamation would approve an exchange of groundwater pumped from the TQID Well Field of up to 6,000 acre-feet for the balance of this irrigation season (2009-2010) and up to 8,000 acre feet next irrigation season (2010-2011).

Pursuant to previous agreements regarding water quality associated with pumping groundwater for exchange in Mendota Pool, such pumped groundwater would be tested and held subject to water quality standards established for pumped groundwater entering Mendota Pool. Testing would occur prior to the beginning of pumping for purposes of providing water for this exchange for each irrigation season.

Additionally, TQID would monitor groundwater levels in the TQID Well Field and monitoring wells in the area on a monthly basis. The intent of this monitoring is to prevent groundwater levels from reaching what are believed to be historic low levels so as to insure that there would not be any inelastic subsidence in the area resulting from the extended use of the TQID Well Field by TQID for purposes of the exchange. See Figure 2-2 for the location of the TQID Well Field and the monitoring wells. The historic low water levels in the confined aquifer in this area are believed to be at approximately 30 feet below msl. Current water levels are at approximately 40 feet above msl. The proposed program of groundwater extraction and exchange would be stopped if resulting groundwater levels in monitor wells appear to be within 5 feet of the historic low levels. Water levels in the groundwater extraction wells involved in the Exchange (see Figure 2-2) would be monitored monthly to verify groundwater depths are within the acceptable range.

3.2 Geological Resources

Regional Subsidence

Land subsidence in the SJV has been studied extensively in the past by the USGS and DWR. A State-Federal committee on subsidence was formed in the early 1950's and performed research and measured subsidence until 1970. By 1970, 5,200 square miles in the SJV had subsided more than 1 foot. Between 1926 and 1970, a maximum of 29.7 feet of subsidence was measured at a point southwest of Mendota. The compacting forces caused by groundwater level decline squeezed more than 15.6 million acre-feet of water out of SJV sediments during the same period.

There are two types of land subsidence due to withdrawal of groundwater resources; elastic and inelastic. Elastic subsidence is not permanent and is largely reversible, if water levels recover to above historic low levels. Inelastic subsidence is permanent and occurs when water is removed from a confined aquifer for the first time, and is sometimes referred to as virgin subsidence. Between the mid-1920's to about 1980 the SJV experienced inelastic, non-recoverable subsidence. However, recent studies indicate that current subsidence west of the Proposed Action area is primarily elastic in nature, and would likely not be inelastic until water levels fall below historic low levels.

The most recent reports on land subsidence in the SJV were completed by R.L Ireland of the USGS in 1986 and Arvey A. Swanson of DWR in 1995. Ireland (1986) states that *“Land subsidence to groundwater withdrawal in the SJV that began in the mid-1920’s and reached a maximum of 29.7 feet in 1981 has been halted by the importation of surface water through major canals and the California Aqueduct in the 1950’s through 1970’s.”* This was evident because large scale regional subsidence had halted, but smaller-scale local subsidence continued in many areas.

Poland and others (1975) estimated that cumulative non-recoverable land subsidence from 1926 to 1972 in the vicinity of Tranquillity was on the order of 8 feet. Their land subsidence contour map shows even higher subsidence (12 feet over the period of record) west of the Proposed Action area.

Land subsidence is a function of groundwater pumping and recharge, and it is linked to declines in groundwater levels. DWR Bulletin 118 states that from 1970 to 2000 groundwater levels have increased by an average of 2.2 feet in the Delta-Mendota sub-basin. Figure 3-4, is a DWR hydrograph for well 15S16E21Q001M showing that water levels fell by nearly 75 feet from 1939 to 1971, from 1970 to 2000 water levels have been fairly stable, with changes based on surface water allocations. This hydrograph is in general agreement with DWR Bulletin 118, and, since Poland and others (1975) show a direct correlation between subsidence and pumpage, the rate of permanent inelastic subsidence in the Tranquillity area likely have slowed.

In a 1996 draft memo, DWR indicated that from 1975 to 1992 subsidence occurred primarily in drought years when groundwater supplies replaced surface water supplies. The most recent record of land subsidence in the area is from Swanson (1995), where he indicates that 2 feet of subsidence occurred along the Outside Canal near Mendota Dam between the years of 1970 and 1994. However, it is not known how much of the 2 feet of subsidence reported by Swanson was residual subsidence from times of high pumpage from the mid-1920’s to 1981. Data from six extensometers located west of the Proposed Action area indicates that subsidence there has been elastic since about 1977, which probably indicates that subsidence in the plan area since about 1977 has been elastic in nature, and will not be permanent subsidence until water levels fall below historic low levels. Given the program of monitoring of groundwater levels and program termination of water levels are approaching historic lows, it is not anticipated that there would be any inelastic subsidence created by the exchange pumpage.

Damage from Deep Land Subsidence

Land subsidence caused by pumping of groundwater in large quantities in the Proposed Action area is well documented (DWR 2002, Swanson 1998, Galloway and Riley 1999, Bull and Miller 1975). This has resulted in damage to canals, highways, well casings, changes in canal capacity, and changes in surface water drainage patterns with flooding occurring where these problems have been attributed to other causes (Swanson 1998). See Figure 3-5 for a reproduction of information from others on historic subsidence in the TQID area.

3.2.1 Environmental Consequences

No Action

The No Action Alternative consists of not approving the delivery of TQID groundwater through the Fresno Slough to the Mendota Pool in exchange for a CVP supply in SLR that would be delivered to SLWD. TQID would likely pump less groundwater this year than what is being proposed, but additional groundwater pumping would occur in the SLWD service area and/or additional permanent crops would be at risk.

Proposed Action

Elastic and recoverable subsidence occurs as long as water levels remain above historic lows. A review of water levels in the area of TQID for the 1963 - 1967 low was compared with water levels for April 2009. It was found that water levels for the most recently available data are 70 to 100 feet above historic lows. In this region during the 1976-1977 and 1987-1992 droughts, water levels fell about 80 feet per year. Pumping for the current year would cause a water level fall which would be above the historic low in the vicinity of the wells involved in the exchange. Subsidence that occurs from pumping these wells this season would therefore be elastic and recoverable upon the return of water levels.

3.3 Land Use

3.3.1 Affected Environment

San Luis Water District

SLWD is located on the western side of the SJV near the City of Los Banos, in both Merced and Fresno Counties. Construction of the Delta-Mendota Canal (DMC) in the 1950s sparked major development of farmland in the SJV that led to the formation of SLWD in January 1951. SLWD's current size is approximately 66,218 acres.

SLWD's current distribution system includes 52 miles of pipelines, 10 miles of lined canals, and 7.5 miles of unlined canals. About 20,000 acres within SLWD, referred to as

the Direct Service Area, receive water from 39 turnouts on the DMC and 23 turnouts on the SLC. In addition to the Direct Service Area, three improvement districts are also served through distribution systems branching off the SLC. Improvement District 1 is located primarily within Fresno County; Improvement District 2 is located entirely within Fresno County; Improvement District 3 is located entirely within Merced County. The current population within SLWD is approximately 700, with most individuals residing in the community of Santa Nella, located in the extreme northern portion of the district.

The southern section of the district located in Fresno County is primarily agricultural. The land is planted with either row crops, including cotton and melons, or permanent crops, including primarily almonds. In recent years, some parcels in this area of the district have not been farmed because they are of marginal quality or have high water costs or drainage problems.

CVP water is the SLWD's only long-term water supply. SLWD does not own any groundwater wells and has no other long-term contracts for surface or groundwater supplies. All of the groundwater wells in the area are privately owned and operated. About 20 private agricultural wells provide water to 6,000 acres in the Direct Service Area. The vast majority of SLWD's water users do not have meaningful access to groundwater that can be used for irrigation, and therefore, supplementation of the CVP supply is nominal.

Although water deliveries by the SLWD historically have been almost exclusively used for agricultural use, substantial development in and around the cities of Los Banos and Santa Nella have resulted in a shift of some water supplies to M&I use. The SLWD currently supplies approximately 1,200 af/y to approximately 1,300 homes and businesses. M&I demands within SLWD are expected to increase.

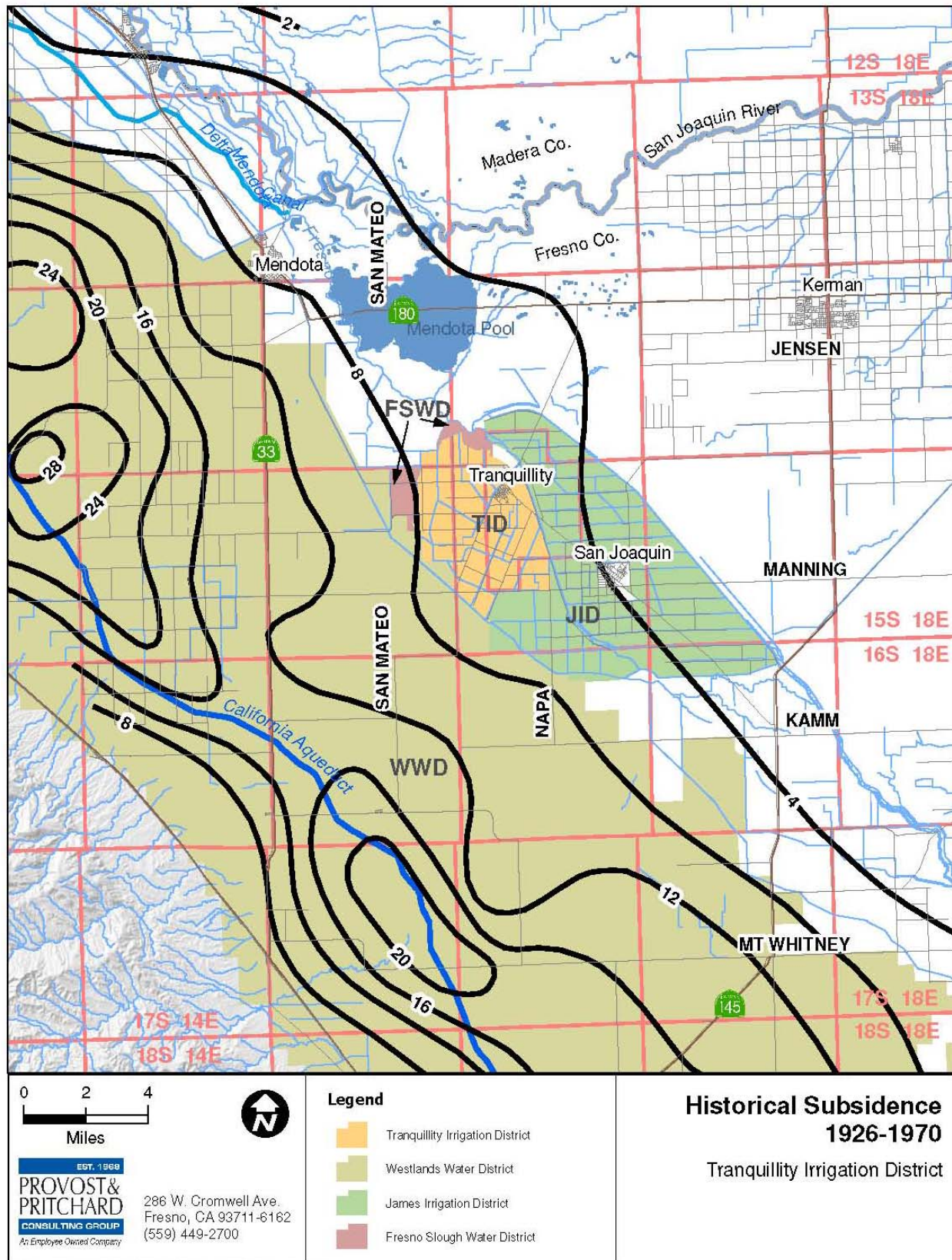


Figure 3-5 Historical Subsidence in TQID Area

M&I use primarily occurs in the northern section of SLWD, which is located in Merced County. It is anticipated that the conversion from agricultural use to M&I use will occur mostly in this section of SLWD. Approximately 10,000 acres identified as potential development locations are currently in the planning stages within Merced County and the SLWD. Much of the land targeted for M&I development is currently unused for irrigated agriculture.

Individual landowners within SLWD get the water they need by performing water transactions. To supplement CVP water, landowners in SLWD often participate in water transfer arrangements. Even in a year of 100 percent CVP allocation, many landowners would not have the amount of water that they need. SLWD implements the “free market” approach to water transfers and allows individual water users to maximize the efficient use of their supplies by transferring water both within and outside SLWD boundaries. Very few restrictions are placed on such transfers. Water transfers are for a single year only and must be renewed annually; water transfers cannot be relied upon as a long-term supply.

Tranquillity Irrigation District and Fresno Slough Water District

TQID encompasses approximately 10,750 acres in the west central portion of Fresno County in California's Central SJV. The principal community is the unincorporated community of Tranquillity, which is within the District boundary. FSWD is located on the north and northwestern edge of TQID. The District includes 1,459 acres and has approximately 1,030 acres of cropped land consisting primarily of field crops. Refer to Figure 2-1 for a vicinity map and Figure 2-2 for a map of the Districts. The vast majority of farmland in both service areas is classified as Irrigated Farmland by the California Department of Conservation.

TQID lands are predominately used for the production of irrigated field, row and forage crops. Crops occupying 5 percent or more of the acreage included cotton, sugar beets and canning tomatoes. Other crops grown during 2003 included alfalfa, almonds, wheat, vegetable seed, pasture, and corn. Cropping in FSWD is predominantly canning tomatoes.

The Fresno County General Plan designates most areas within the TQID and FSWD's service areas as “intensive agriculture.” Supplemental irrigation is required for these activities as the area receives an average of only 7.4 inches of rainfall per year. Other agricultural uses, while not directly dependent on irrigation for production, are also consistent with the intensive agriculture designation. Permitted uses include, but are not

limited to, irrigated cropland, orchards, vineyards, horse ranches, beekeeping, ranch and farm facilities, and related uses.

3.3.2 Environmental Consequences

No Action

The No Action Alternative consists of not approving the delivery of TQID groundwater through the Fresno Slough to the Mendota Pool in exchange for a CVP supply in SLR that would be delivered to SLWD. TQID would likely pump less groundwater this year than what is being proposed, but additional groundwater pumping would occur in the SLWD service area and /or additional permanent crops would be at risk. Under this alternative, SLWD would not have an additional water supply or increased delivery flexibility to alleviate a portion of the impacts of this third dry year. Under the No Action Alternative it is believed that additional land would be taken out of production. SLWD could attempt to purchase other sources of water or construct new facilities; however, no sources of additional water are known and construction would likely not be completed in time to meet SLWD needs.

Proposed Action

The proposed exchange would provide additional surface water to allow SLWD agricultural lands to remain in production, and to transfer groundwater for future delivery to support existing farmlands and minimize the potential for fallowing agricultural land. No new agricultural development is expected under the proposed exchange. The conveyance of the groundwater through CVP facilities would not contribute to changes in land use. The proposed exchange would generate no new housing and would result in no new permanent population growth that would exceed official regional or local population projections in the TQID or SLWD service areas. The approval to be covered under this EA would be for 2009-2011 and would be limited to use of this groundwater with no resulting land use changes.

3.4 Air Quality

3.4.1 Affected Environment

Despite years of improvements, the SJV air basin does not meet state and federal health-based air-quality standards. To protect health, the SJV Air District is required by federal law to adopt stringent control measures to reduce emissions.

Section 176 (c) of the Clean Air Act (42 U.S.C. 7506 (c)) requires any entity of the Federal government that engages in, supports, or in any way provides financial support

for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the Federal Clean Air Act (42 U.S.C. 7401 (a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of those standards. Each federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will, in fact conform to the applicable SIP before the action is taken.

On November 30, 1993, the Environmental Protection Agency (EPA) promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. The general conformity regulations apply to a proposed federal action in a non-attainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutant caused by the Proposed Action equal or exceed certain de minimis amounts thus requiring the federal agency to make a determination of general conformity. The following de minimis amounts for the region covering Proposed Action area are presented in Table 3-3.

Table 3-3 Conformity de minimis Levels

Pollutant	Federal Status	De minimis (Tons Per Year)
VOC (as an ozone precursor)	Nonattainment serious 8-hour ozone	50
NO _x (as an ozone precursor)	Nonattainment serious 8-hour standard	50
PM 10	Attainment	100
CO	Attainment	100

Sources SJVAPCD 2009; 40 CFR 93.153

No Action

The No Action Alternative consists of not approving the delivery of TQID groundwater through the Fresno Slough to the Mendota Pool in exchange for a CVP supply in SLR that would be delivered to SLWD. TQID would likely pump less groundwater this year than what is being proposed, but additional groundwater pumping would occur in the SLWD service area. Therefore, conditions would remain the same as existing conditions.

Proposed Action

Effects are similar to the No Action Alternative. Of the nine wells that would likely participate in the Proposed Action, none are powered with internal combustion engines.

3.5 Biological Resources

3.5.1 Affected Environment

By the mid-1940s, most of the valley's native habitat had been altered by man, and as a result, was severely degraded or destroyed. It has been estimated that more than 85 percent of the valley's wetlands had been lost by 1939 (Dahl and Johnson 1991). When the CVP began operations, over 30 percent of all natural habitats in the Central Valley and surrounding foothills had been converted to urban and agricultural land use (Reclamation 1999). Prior to widespread agriculture, land within the Proposed Action area provided habitat for a variety of plants and animals. With the advent of irrigated agriculture and urban development over the last 100 years, many species have become threatened and endangered because of habitat loss. Of the approximately 5.6 million acres of valley grasslands and San Joaquin saltbrush scrub, the primary natural habitats across the valley, less than 10 percent remains today. Much of the remaining habitat consists of isolated fragments supporting small, highly vulnerable populations (Reclamation 1999). The project area is dominated by agricultural habitat that includes field crops, orchards, and pasture. The vegetation is primarily crops and frequently includes weedy non-native annual and biennial plants.

The following list (See Table 3-6.) was obtained on Aug. 3, 2009 (Document # 090803031452), by accessing the U.S. Fish and Wildlife Service (Service) Database: http://www.fws.gov/sacramento/es/spp_list.htm . The list is for the following USGS 71/2 minute quadrangles: The list is for the following USGS quadrangles, which overlapped the districts in the TQID and SLWD: Jamesan, San Joaquin, Tranquillity, Cantua Creek, Chounet Ranch, Dos Palos, Hammonds Ranch, Charleston School, Ortigalita Peak NW, Laguna Seca Ranch, Los Banos Valley, Volta, Los Banos and San Luis Dam.

Table 3-4 Species List

Special status species that could potentially occur within in affected area.			
<u><i>Species</i></u>	<u><i>Status</i></u> ¹	<u><i>Effects</i></u> ²	<u><i>Occurrence in the Study Area</i></u> ³
Amphibians			
California red-legged frog (<i>Rana aurora draytonii</i>)	T, PX	NE	Possible. CNDDB records for individuals approx. 2 miles west of SLWD. No individuals or habitat in area of effect. No construction of new facilities; no conversion of lands from existing uses.

California tiger salamander (<i>Ambystoma californiense</i>)	T, X	NE	Absent. No individuals or habitat in area of effect.
Birds			
California condor (<i>Gymnogyps californianus</i>)	E	NE	Possible. Will forage up to 100m from roost/nest. There are records for this species approx. 70m southeast of TQID. No construction of new facilities; no conversion of lands from existing uses.
Burrowing owl (<i>Athene cunicularia</i>)	MB	NE	Present. CNDDDB records indicate this species occurs in the project area. No new construction or modification of existing facilities.
Swainson's hawk (<i>Buteo swainsoni</i>)	MB	NE	Present. CNDDDB records indicate this species occurs in the project area. No new construction or modification of existing facilities.
Fish			
Central Valley Steelhead (<i>Oncorhynchus mykiss</i>)	T, NMFS	NE	Absent. No natural waterways within the species' range will be affected by the proposed action.
Delta smelt (<i>Hypomesus transpacificus</i>)	T	NE	Absent. No natural waterways within the species' range will be affected by the proposed action.
Invertebrates			
Longhorn fairy shrimp (<i>Branchinecta longiantenna</i>)	E	NE	Absent. No individuals or habitat in area of effect.
Valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>)	T	NE	Absent. Closest record in approx. 3 miles from area from 1987. No individuals documented in this area.
Vernal pool fairy shrimp (<i>Branchinecta lynchi</i>)	T	NE	Absent. No individuals or habitat in area of effect.
Vernal pool tadpole shrimp (<i>Lepidurus packardii</i>)	E	NE	Absent. No individuals or habitat in area of effect.
Mammals			
Fresno kangaroo rat (<i>Dipodomys nitratoides exilis</i>)	E, X	NE	Absent. Believed extirpated from area. No individuals or habitat in area of effect. No new construction or modification of existing facilities.
giant kangaroo rat (<i>Dipodomys ingens</i>)	E	NE	Absent. No individuals or habitat in area of effect.
San Joaquin kit fox (<i>Vulpes mactotis mutica</i>)	E	NE	Present. CNDDDB records indicate this species occurs in the project area. No construction of new facilities; no conversion of lands from existing uses.
Plant			
Palmate-bracted bird's-beak (<i>Cordylanthus palmatus</i>)	E	NE	Absent. No individuals or habitat in area of effect.
Reptiles			
Blunt-nosed leopard lizard (<i>Gambelia sila</i>)	E	NE	Present. Documented as extant along western border of SLWD. No construction of new facilities; no conversion of lands from existing uses
Giant garter snake (<i>Thamnophis gigas</i>)	T	NE	Present. Presumed extant from area. Latest records from 1976. No construction of new facilities; no conversion of lands from existing uses. Water quality will be continuously

monitored and will comply with established water quality standards (see Proposed Action section above).

1 Status= Listing of Federally special status species, unless otherwise indicated.

C: Candidate to become a proposed species.

E: Listed as Endangered.

T: Listed as Threatened.

MB: Those species protected by the Migratory Bird Treaty Act.

NMFS: Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service.

PX: Critical Habitat designated for this species.

X: Critical Habitat designated for this species.

2 Effects = NE = No Effect determination.

3 Definition Of Occurrence Indicators

Present: Species observed in area

Possible: Species no observed at least in the last 10 years

Absent: Species not observed in study area and habitat requirements not met.

3.5.2 Environmental Consequences

No Action

Under the No Action Alternative, there would be no impacts to biological resources since conditions would remain the same as existing conditions.

Proposed Action

Given that water quality would adhere to established standard requirements, effects are similar to the No Action Alternative. Selenium concentrations would not exceed 2 µg/L, and therefore, there would be no impact to giant garter snake from the Proposed Action. Although the Proposed Action would exchange water through the Mendota Pool, water levels and flow of the Mendota Pool would not change and would therefore, not have an impact on the existing biological habitats. The proposed exchange would not involve the conversion of any land and would therefore not change the land use patterns of the cultivated or fallowed fields that do have some value to listed species or birds protected by the Migratory Bird Treaty Act (MBTA). Since no natural stream courses alteration would occur, there would be no effects on listed fish species.

3.6 Cultural Resources

3.6.1 Affected Environment

Cultural resources is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The SJV is rich in historical and prehistoric cultural resources. Cultural resources in this area are generally prehistoric in nature and include remnants of native human populations that existed before European settlement. Prior to the 18th Century, many Native American tribes inhabited the Central Valley. It is possible that many cultural resources lie undiscovered across the SJV. The SJV supported extensive populations of Native Americans, principally the Northern Valley Yokuts, in

the prehistoric period. Cultural studies in the SJV have been limited. The conversion of land and intensive farming practices over the last century has probably destroyed many Native American cultural sites.

3.6.2 Environmental Consequences

No Action

Under the No Action Alternative, there are no impacts to cultural resources since there would be no ground disturbance. Conditions related to cultural resources would remain the same as existing conditions.

Proposed Action

Exchanging water as described in the proposed exchange would not result in impacts to archeological or cultural resources as no land disturbance would occur. These lands are agricultural lands that have undergone cultivation and land disturbance for more than 20 years.

3.7 Indian Trust Assets

3.7.1 Affected Environment

Indian trust assets (ITA) are legal interests in assets that are held in trust by the U.S. Government for federally recognized Indian tribes or individual Indians. The trust relationship usually stems from a treaty, executive order, or act of Congress. The Secretary of the Interior is the trustee for the United States on behalf of federally recognized Indian tribes. “Assets” are anything owned that holds monetary value. “Legal interests” means there is a property interest for which there is a legal remedy, such as a compensation or injunction, if there is improper interference. Assets can be real property, physical assets, or intangible property rights, such as a lease, or right to use something. ITAs cannot be sold, leased or otherwise alienated without United States’ approval. ITAs may include lands, minerals, and natural resources, as well as hunting, fishing, and water rights. Indian reservations, rancherias, and public domain allotments are examples of lands that are often considered trust assets. In some cases, ITAs may be located off trust land.

Reclamation shares the Indian trust responsibility with all other agencies of the Executive Branch to protect and maintain ITA reserved by Indian tribes, or individual Indians by treaty, statute, or Executive Order.

The nearest ITA is Santa Rosa Rancheria which is approximately 36 miles southeast of the Proposed Action location.

3.7.2 Environmental Consequences

No Action

Under the No Action Alternative there would be no impacts to ITA, since conditions would remain the same as existing conditions.

Proposed Action

There are no tribes possessing legal property interests held in trust by the United States in the water involved with this action, nor is there such a property interest in the lands designated to receive the water proposed in this action.

There are no ITA, Indian Reservations, or public domain allotments found within the water districts involved. Therefore, the Proposed Action would not affect ITA.

3.8 Socioeconomic Resources

3.8.1 Affected Environment

The agricultural industry significantly contributes to the overall economic stability of the SJV. The CVP allocations each year allow farmers to plan for the types of crops to grow and to secure loans to purchase supplies. Depending upon the variable hydrological and economical conditions, water transfers and exchanges could be prompted. The economic variances may include fluctuating agricultural prices, insect infestation, changing hydrologic conditions, increased fuel and power costs.

3.6.2 Environmental Consequences

No Action

Under the No Action Alternative economic conditions in the vicinity of SLWD would continue to worsen. SLWD has limited groundwater and without this exchange agricultural land would be taken out of production. As agricultural land is taken out of production there will be a decreasing need for farm labor, and farm equipment and supplies. The additional economic impacts of reduced agricultural production would exacerbate the already declared disastrous impacts that water shortage is having on this part of the San Joaquin Valley's economy.

Proposed Action

The Proposed Action would exchange pumped groundwater through Mendota Pool to the SLWD. The exchange would not interfere with SWP or CVP priorities or operations and would result in temporarily increased water supply reliability for SLWD. The proposed exchange would have a positive socioeconomic impact to the SLWD area in that agricultural land would be maintained in production and the associated farm service industries would also be supported. The proposed exchange would allow for some additional portion of continued water deliveries to SLWD and would help to maintain the

stability of the agricultural market and economical vitality for this part of the San Joaquin Valley to some degree.

3.9 Environmental Justice

3.9.1 Affected Environment

Executive Order 12898, dated February 11, 1994, requires Federal agencies to ensure that their actions do not disproportionately impact minority and disadvantaged populations.

The market for seasonal workers on local farms draws thousands of migrant workers, commonly of Hispanic origin from Mexico and Central America.

3.9.2 Environmental Consequences

No Action

The No Action Alternative would continue to allow the poor economic conditions in the area to worsen. As farm workers are almost entirely made up of individuals from disadvantaged communities and poor economic conditions in the farm economy have disproportionate impacts on those that work on the farm, the conditions of harm to minority or disadvantaged populations in this region would persist.

Proposed Action

The proposed exchange would not cause dislocation, changes in employment, or increase flood, drought, or disease. The proposed exchange would positively impact economically disadvantaged or minority populations. This exchange is intended to allow the delivery of water supplies from TQID to SLWD, via the Mendota Pool. The population of some small communities typically increases during late summer harvest. Without the exchanged water, some field crops may not be planted or may become stressed. The unemployment rate in the vicinity of TQID and SLWD suggests that any actions that maintain seasonal jobs would be considered beneficial.

3.10 Global Climate Change

3.10.1 Affected Environment

Climate change refers to significant change in measures of climate (e.g., temperature, precipitation, or wind) lasting for decades or longer. Many environmental changes can contribute to climate change (changes in sun's intensity, changes in ocean circulation, deforestation, urbanization, burning fossil fuels, etc.). (Environmental Protection Agency [EPA] 2008a)

Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHG (e.g., fluorinated gases) are created and emitted solely through human activities. The principal greenhouse gases that enter the atmosphere because of human activities are: carbon dioxide (CO₂), methane (CH₄), nitrous oxide, and fluorinated gasses (EPA 2008a).

During the past century humans have substantially added to the amount of GHG in the atmosphere by burning fossil fuels such as coal, natural gas, oil and gasoline to power our cars, factories, utilities and appliances. The added gases, primarily CO₂ and CH₄, are enhancing the natural greenhouse effect, and likely contributing to an increase in global average temperature and related climate changes. There are uncertainties associated with the science of climate change (EPA 2008b).

More than 20 million Californians rely on the SWP and CVP. Increases in air temperature may lead to changes in precipitation patterns, runoff timing and volume, sea level rise, and changes in the amount of irrigation water needed due to modified evapotranspiration rates. These changes may lead to impacts to California's water resources and project operations.

While there is general consensus in their trend, the magnitudes and onset-timing of impacts are uncertain and are scenario-dependent. (Anderson et al. 2008)

No Action

Implementation of the No Action Alternative would have no change on the composition of the atmosphere and therefore would have no direct or indirect effects to climate.

Proposed Action

The Proposed Action would not include any change on the composition of the atmosphere and therefore would have no direct effects on changes in climate.

3.11 Cumulative Impacts

In order to meet irrigation demands, SLWD is pursuing other potential water transfers including those listed below. Due to the complexity of several necessary exchanges and Delta pumping constraints, some of these proposed transfers may not come to fruition.

1. Transfer of up to 6,600 acre feet from the San Joaquin River Exchange Contractor 5-year Transfer Program

2. Potential Transfer of up to 2,600 acre feet from the Department of Water Resources Drought Water Bank, subject to adequate surplus pumping capacity at the DWR's Banks pumping facility.
3. Potential Transfer of up to 2,500 acre feet from Yuba long term transfer program, subject to adequate surplus pumping capacity at DWR's Banks pumping facility.
4. Potential transfer of up to 5,300 acre feet of Cross Valley water supply subject to adequate surplus pumping capacity at DWR's Banks pumping facility.
5. Potential Transfer of up to 10,000 acre feet from Fresno Irrigation District's water bank subject to the completion of environmental work, approval of Reclamation and the support of as yet unknown exchange partners to wheel the water up the California Aqueduct.
6. Potential Transfer of up to 5,000 acre feet CVP supply from Orange Cove ID, subject to the completion of environmental work, approval of Reclamation and the support of as yet unknown exchange partners to wheel the water up the California Aqueduct.
7. Transfer and exchange of up to 8,000 acre feet of groundwater delivered via the Delta Mendota Canal.

The proposed exchange, when added to other actions, would not contribute to significant increases or decreases in environmental conditions. These water service actions would be temporary, lasting only through 2011, and amount to incremental increases in groundwater pumping. The proposed exchange was found to have no adverse impact on biological resources, cultural resources, Indian Trust Assets, air quality (because there would be no ground disturbance or construction of new facilities) and socioeconomics and no substantial adverse impact on water resources, and geologic resources. Therefore there is no contribution to cumulative impacts to any these resource areas. Overall there would be no cumulative impacts caused by the proposed exchange.

Section 4 Consultation and Coordination

4.1 Fish and Wildlife Coordination Act (16 USC § 651 et seq.)

The Fish and Wildlife Coordination Act (FWCA) requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. Since there would be no ground disturbance and water would move in existing facilities the FWCA does not apply.

4.2 Endangered Species Act (16 USC §1531 et seq.)

Section 7 of the ESA requires Federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species. Since there would be no ground disturbance and water would move in existing facilities there would be no effect on endangered species.

4.3 National Historic Preservation Act (16 USC § 470 et seq.)

The NHPA of 1966, as amended (16 USC 470 et seq), is the primary legislation that outlines the Federal government's responsibility to cultural resources. Cultural resources include both archaeological and built environment resources. Section 106 of the NHPA requires that Federal agencies take into consideration the effects of their undertakings on historic properties. Historic properties are cultural resources that are listed on or eligible for inclusion in the National Register of Historic Places (National Register). The CFR Part 800 regulations implement Section 106 of the NHPA and outline the procedures necessary for compliance with the NHPA.

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of federal undertakings on historic properties, properties determined eligible for inclusion in the National Register. Compliance with Section 106 follows a series of steps that are designed to identify interested parties, determine the area of potential effect (APE), conduct cultural resource inventories, determine if historic properties are present within the APE, and assess effects on any identified historic properties. The Federal agency consults with the State Historic Preservation Officer (SHPO) on agency determinations and findings and seeks their concurrence with the Federal agency findings.

The activities associated with implementing the exchange described in the proposed exchange would include no new ground disturbance, no change in land use, and the use of existing conveyance features to move the exchanged water. Reclamation has determined that there would be no potential to affect historic properties by the proposed action pursuant to 36 CFR 800.3(a)(1).

4.4 Migratory Bird Treaty Act (16 USC § 703 et seq.)

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the MBTA provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the MBTA, the Secretary of the Interior may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns.

The proposed exchange would not affect birds protected under the MBTA.

4.5 Executive Order 11988 – Floodplain Management and Executive Order 11990-Protection of Wetlands

Executive Order 11988 requires Federal agencies to prepare floodplain assessments for actions located within or affecting flood plains. Executive Order 11990 places similar requirements for actions in wetlands. The proposed exchange would not affect either concern.

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